

STACHYS (LABIATAE) IN SOUTHEASTERN UNITED STATES

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ABSTRACT

The genus *Stachys* is well represented in North America. Within southeastern United States, seven species occur in a variety of habitats, some taxa very localized, some quite widespread. Field and herbarium study reveal the generally high variability among these species, thus warranting the characterization of *Stachys* as a "difficult" genus taxonomically. Future studies on the cytology and breeding systems at work within *Stachys* will be necessary for an understanding of these species' interrelationships.

The essentially cosmopolitan genus *Stachys* consists of about 200 species in the subfamily Stachydoideae, making it one of the larger genera of Labiatae. Various subgeneric dispositions of *Stachys* have been presented; Bentham (1832-1836) divided it into nine sections. Taxonomically, the genus is noted for the frequent occurrence of related taxa forming "species groups" (ten such groups were proposed by Epling 1934), these often intergrading and creating confusion. *Stachys* occurs extensively throughout North America. The eastern areas of Canada and the United States are especially rich in species, due to conjunction of Old World and New World taxa. As Epling (1934) stated, it is then not surprising that *Stachys* develops "a bewildering complex of cross-relationships" in eastern North America. Further, European and Asian counterparts to various American species occur in this region, adding to the confusion.

Seven native or definitely naturalized species are recognized in southeastern United States (the geographic area bounded by and including Louisiana, Arkansas, Tennessee, Kentucky, West Virginia, Maryland, and Delaware), where the genus occurs widely and in a number of habitats. Several taxa are endemic. Some introductions appear sporadically as ephemeral weeds or escaped cultivated species. Economic uses will be mentioned in the specific treatments.

Historical Account. The name *Stachys* is derived from the Greek meaning a spike of wheat (some field manuals and popular accounts describe the inflorescence as a "spike," which is technically incorrect). Pliny's use of the word in his *Historia Naturalis* makes reference to a wild plant, although his description does not pin down a particular genus. Linnaeus (1753) retained Tournefort's original usage of this generic name (Tournefort 1700).

Bentham's *Genera et Species Labiatarum* (1832-1836) remains to date the only world-wide monograph for the Labiatae, although Briquet (1897) provided an extensive treatment in *Die Natürlichen Pflanzenfamilien*. Briquet variously rearranged Bentham's earlier sectional placements for *Stachys*; five sections were recognized, with all native southeastern United States species assigned to *Eustachys* (= section *Stachys*).

Epling's (1934) treatment of *Stachys* in North and South America remains our only monographic source available for the genus. Considering the American species highly complex, Epling wrote, "Since the genus forms a network of interrelated species it is difficult to cast them into even an artificial scheme which is satisfactory" (p. 1). He further stated that continued research on Eurasian species would probably effect changes in his ten artificial and admittedly "temporary" species-groups. Epling also pointed out the possibility of vicariance within the genus, with distinctly European or Asian taxa (including *S. silvatica* and *S. chinensis*) forming counterparts with North American forms (*S. nuttallii* and *S. byssopifolia*).

Elliott (1824) recognized four species from the Carolinas and Georgia, all (in his treatment) restricted to the Coastal Plain. In this early work, it is recognized that obvious problems occur in separating taxa; for example, Elliott questioned the status of Michaux's *S. aspera*.

Gray (1886) attempted the first infraspecific division of *S. byssopifolia* Michx., with the formation of his variety *ambigua*. At this point, some indication of the confusion in the status of *S. tenuifolia* Willd. and its varieties can be seen, all of which were merged under *S. aspera* Michx.

Small (1933) re-emphasized infrageneric treatment in his handling of the genus. The five sections he devised are somewhat artificial in set-up, and the key in his *Manual* is rather trying. Generally, though, his treatment of the southeastern species is in agreement with earlier workers in noting the importance of character states such as calyx-lobe length and leaf-base shape in delimiting taxa.

Britton and Brown (1947) listed 13 species occurring in the southeast. The approach here was characteristically toward splitting taxa, with *S. aspera* Michx. and *S. ambigua* (A. Gray) Britt. (not *S. ambigua* J. Smith) separated as distinct taxa. All taxa with affinities to *S. byssopifolia* were given specific status. The rare and unestablished *S. arvensis* L. and *S. annua* L. were also considered.

Fernald's (1950) revision of *Gray's manual of botany* offers a critical analysis of *S. palustris* and *S. tenuifolia*, each divided into numerous varieties. In total, he recognized 11 species, six of which are native to the area.

Within the Carolinas, Radford et al. (1968) recognized considerable confusion among the montane species. My research has, in part, supported the view in their treatment that several Blue Ridge Mountain taxa may represent a single polymorphic species. Knowledge of the systematics of this genus in the southeast will definitely be augmented by future cytotaxo-

onomic studies; the karyology of *Stachys* is poorly known in this region, and its breeding behavior even less well known.

MATERIALS AND METHODS

Results and conclusions are based largely on field observations and collections made in the southeast and on studies of over 2000 herbarium specimens loaned by the following herbaria or seen during visits to them (abbreviations as in *Index Herbariorum*, ed. 3): AUA, CHRB, CLEMS, DUKE, F, FLAS, FSU, GA, GEO, GH, HNH, KY, LAF, MAINE, MARY, MICH, MISS, NCSC, NCU, NLU, NY, P, PENN, PH, QFA, QK, QUE, TENN, TRT, UARK, UCLA, UNA, UNCC, US, USCH, VPI, VT, and WVA. In addition, photographs and/or xeroxes of type collections were supplied by F, HAL, K, MO, NY, and PH.

Study of herbarium specimens has allowed the compilation of measurements for many character states useful in delimiting taxa. Involved in circumscribing each taxon were measurements of plant height, leaf width and length and petiole length for upper and lower leaves, inflorescence length, number of verticils per inflorescence, number of flowers per verticil, calyx-tube length, calyx-lobe length, corolla length, and mericarp dimensions. As expected, certain of these measurements are more important than others. Descriptions of each taxon have been produced. County distributions have been recorded from information on herbarium labels as well as from field collections; each dot on the maps represents the occurrence of at least a single population in a given county.

Field observations and collections were made of living *Stachys* populations from 1974 to 1979. Duplicates of collections have been, or are being, distributed to herbaria from which loans were obtained. A list of specimens examined is not presented in this paper; such a list will be supplied upon request.

SYSTEMATIC TREATMENT

STACHYS [Tourn.] L., Syst. ed. I, 1735, Gen. ed. I, 171, 1737. Gen. Pl. ed. V, 253, 1754.

Generic synonymy as in *Index Kewensis*:

Betonica Tourn. ex L., Syst. ed. I, 1735; Gen. ed. I, 171, 1737.

Zietenia Gled., Syst. 185, 1764.

Trixago Hall., Hist. Stirp. Helv. 101, 1768; Moench, Meth. 398, 1794.

Bonamya Neck., Elem. I, 316, 1790.

Galeopsis Moench, Meth. 397, 1794.

Tetrahitum Hoffmgg. & Link, Fl. Port. I, 105, 1809.

Eriostomum Hoffmgg. & Link, Fl. Port. I, 105, 1809.

Eriostachys Reichb. ex Steud., Nom. ed. II, 588, 1840.

Ambleia Spach, Hist. Veg. Phan. 9, 166, 1840.

Olisia Spach, Hist. Veg. Phan. 9, 166, 1840.

Trixella Fourr. in Ann. Soc. Linn. Lyon, N.S. 17:135, 1869.

Ortostachys Fourr. in Ann. Soc. Linn. Lyon, N.S. 17:136, 1869.

Aspasia E. Mey. ex Pfeiff., Nom. I, 298, 1873.

Stechys Boiss., Fl. Orient. IV, 694, 1879. Err. typog.

Annual, or usually perennial herbs, the underground parts often prominently tuberous-thickened. Stems quadrangular, erect or sometimes sprawling, generally not more than 1 meter tall, glabrous to strongly hispid. Leaves opposite, decussate, the petioles absent to well-developed, the blades linear to broadly ovate. Inflorescence of verticillate cymules, the lowest verticil often with only 2 flowers, otherwise each cymule 3 or more flowered, each verticil with 2 foliose bracts. Flowers perfect, short-pedicellate, subtended by 2 bracteoles. Calyx regular, 5-lobed, the lobes usually awned. Corolla bilabiate, the upper lip galeate, the lower lip 3-lobed. Stamens 4, didynamous, barely exserted. Ovary of 2 carpels, superior, bearing 4 ovules, the style gynobasic and exserted, the stigma bifid. Mericarps 4 per ovary, or fewer by abortion.

Type species: *Stachys sylvatica* L.

KEY TO SOUTHEASTERN STACHYS

1. Leaves sessile or short-petioled, the petioles (if present) less than 1/6 the length of the longest blades 2.
2. Plants slender, glabrous to hispid, lower stem sides not glandular, or rarely so; leaves linear to narrowly elliptic, usually not more than 1 cm wide 1. *S. byssopifolia*
3. Plants glabrous to glabrate; leaves essentially entire, or with some small teeth towards the apex 4
4. Leaves linear, to 10 times as long as broad 1a. var. *byssopifolia*
4. Leaves elliptic, to 4 times as long as broad 1b. var. *lythroides*
3. Plants glabrous to glabrate; leaves essentially entire, or with some small teeth towards the apex 4
2. Plants robust, pubescent, the upper stem sides mostly glandular; leaves ovate-lanceolate to lanceolate, not less than 1 cm broad 2. *S. eplingii*
1. Leaves with distinct petioles 1/4 the length of longest blades, or longer 5
5. Leaves 6–11 cm long; stem angles hispid to merely roughened 6
6. Upper stem sides glabrous; leaf bases truncate to rounded, blades elliptic to lanceolate 3. *S. tenuifolia*
7. Calyx lobes about as long as the tube; stem angles glabrous to bristly 8
8. Leaves elliptic-ovate, broadest near middle 3a. var. *tenuifolia*
8. Leaves lanceolate, tapering from a mostly truncate base 3b. var. *perlonga*
7. Calyx lobes shorter than tube; stem angles glabrous to roughened, never bristly 3c. var. *latidens*
6. Upper stem sides lightly pubescent; leaf bases mostly cordate, the blades ovate 9
9. Inflorescence lax, sometimes nodding slightly; bracts rapidly reduced upwards from first fertile node 4. *S. nuttallii*
9. Inflorescence stout; bracts gradually reduced upwards 5. *S. clingmanii*
5. Leaves shorter, usually no longer than 6 cm; stems glabrous to lightly villous, occasionally hirsute 10
10. Perennial; calyx tube 6–7 mm long; corolla 10–13 mm long 6. *S. floridana*
10. Annual; calyx tube 2–2.5 mm long; corolla 5 mm long 7. *S. crenata*

1. STACHYS HYSSOPIFOLIA Michx., Fl. Bor. Amer. 2:4. 1803.

TYPE: U.S.A. Probably SOUTH CAROLINA: without location, without date, *Michaux s.n.* (ISOTYPE: P!; Photograph of isotype!).

Perennial from tuberous or thickened roots. Aerial stems sprawling or erect; flowering stems 35–82 cm tall, very often highly branched from the lower nodes; stems completely glabrous to definitely hispid along the angles, with the nodes lightly bearded. Leaves sessile or short-petioled, 2–6 cm long, 0.2–3 cm wide, glabrous, margins entire or very shallowly toothed mostly near the apex, sometimes revolute; leaf bases rounded to acute to narrowly cuneate. Inflorescence of 5–15 verticils, each 6 (or fewer)-flowered, each with a pair of sessile bracts to 6 mm long. Calyx lobes about equal to tube in length, usually widely divergent in fruit, each with a stiff glabrous awn; lobe margins glabrous to ciliate, occasionally serrated. Corolla 10–13 mm long. Mericarps 1.5–2 mm long, smooth to finely reticulate.

1a. STACHYS HYSSOPIFOLIA Michx. var. HYSSOPIFOLIA

S. atlantica Britt., Man. Fl. N. U. S. 792. 1901.

TYPE: U.S.A. NEW YORK: Long Island, without date, *Clute* 277 (HOLOTYPE: NY!).

Flowering stems 18–35 cm tall, nearly totally glabrous, or the angles with a few scattered retrorse trichomes. Leaves lanceolate or linear, the upper surface glabrous or occasionally lightly hispid, the lower surface glabrous; leaf margins entire. Calyx usually glabrous, or with a few jointed hairs on the upper 3 lobes.

Sandy lake edges, sinks, and savannahs on the Coastal Plain from Georgia to Delaware (fig. 1). Outside of the southeast, this variety is known from Pennsylvania north to Massachusetts and from the southern reaches of Lake Michigan, including sites in Illinois, Indiana, and Michigan.

Elliott's (1824) treatment of *S. hyssopifolia* is probably concerned with this variety. He described it as growing "like all the other species of the genus, in wet pine-barrens, most common in the middle country of Carolina and Georgia." While wet pine-barrens seem a likely habitat for this plant, it is hardly true for all the species of genus, even those within the Carolinas.

Britton's *S. atlantica* represents a short-leaved form; Britton himself suggested it as a "wet-ground race" of the typical variety.

The obvious disjunct distribution within this variety is of interest. The southeastern plants are essentially indistinguishable from those in the Lake Michigan area. Apparently, the variety is not known in the intervening areas between the southeast and the upper midwest. Similarly, plants from the southern and northern reaches of the variety on the Atlantic coast show no distinction morphologically. Populations from Barnstable County, Massachusetts, and from Aiken County, South Carolina, that I have seen are essential alike, although it appears that the Massachusetts plants might have a weedy

tendency, being present in places around buildings and in disturbed ground.

1b. *STACHYS HYSSOPIFOLIA* Michx. var. *LYTHROIDES* (Small) J. Nelson, *Phytologia* 46:94. 1980.

Basionym: *S. lythroides* Small, Fl. S. E. U. S. 1031. 1903.

TYPE: U.S.A. FLORIDA: near Tallahassee, *Berg s.n.* (HOLOTYPE: NY!).

Flowering stems 60–80 cm tall, very often branched near the base, and often sprawling; stem sides glabrous, the angles somewhat rough-hispid, more so near the apex. Leaf blades elliptic to narrowly rhomboid, the apices rounded to acute; margins entire or sometimes obscurely toothed near apex, both surfaces glabrous. Calyx glabrous, or with numerous jointed trichomes on upper half of the tube.

Known only from Leon County, Florida, in a few scattered locations (fig. 1); this variety is considered a threatened plant in Florida. The two populations I have seen occur in dissimilar habitats. The first, and larger, population is found in abundance on about 3 acres of cut-over, drained bottom-land, receiving much sun. The second, smaller, population is entirely within a forested area, where there is much more shade. Both sites have standing water frequently throughout the year.

1c. *STACHYS HYSSOPIFOLIA* Michx. var. *AMBIGUA* A. Gray, Syn. Fl. 2:387. 1878.

TYPE: U.S.A. MISSOURI: near St. Louis, without date, *Engelmann s.n.* (HOLOTYPE: GH!).

S. aspera Michx., Fl. Bor. Am. 2:5. 1803.

TYPE: U.S.A. Probably SOUTH CAROLINA: without date, *Michaux s.n.* (ISOTYPE: P!; Photograph of isotype!).

S. ambigua (A. Gray) Britt., Mem. Torr. Bot. Club 5:288. 1894. Not *S. ambigua* J. Smith, Engl. Bot. 30: pl. 2089. 1810.

S. grayana House, N. Y. State Mus. Bull. 293:60 1921.

Flowering stems 33–75 cm tall, erect, the angles copiously bristly-hispid, or occasionally glabrate, the sides generally glabrous. Leaves lanceolate to broadly linear, or long-triangular, the upper surface hirsute or glabrous, the lower surface generally glabrous or with scattered trichomes, the margins shallowly serrate. Calyx-lobe margins often densely ciliate.

Southeastern Coastal Plain from Georgia to southern Virginia, extending northward to Pennsylvania; also in Missouri, Iowa, and Illinois (fig. 1). Moist or wet sandy soils of savannahs and open marshes.

This variety is almost always easily separable from the typical variety. Occasional intermediates are seen, in which plant stature seems more that of var. *ambigua*, but with pubescence of stem and calyx that of var. *hyssopifolia*. As does var. *hyssopifolia*, var. *ambigua* shows a discontinuous range, occurring in the southeast as well as some midwestern states.

Nomenclatural problems have arisen involving the placement of this taxon. *Stachys aspera* Michx. has apparently been used as a “catch-all” bi-

nominal for any hispid *Stachys*; Michaux's description indeed suggests a number of forms of *Stachys*. Michaux's specimen is clearly assignable to this variety. Misidentifications of this variety and unclear conceptions of it have no doubt arisen from its seemingly magic ability to "pass into" other related species, as stated by Epling, such as *S. tenuifolia* and *S. palustris*. Britton's *S. ambigua* is rejected due to the earlier publication of the epithet by J. Smith, who was describing a European species, likely of hybrid origin (Wilcox and Jones 1974).

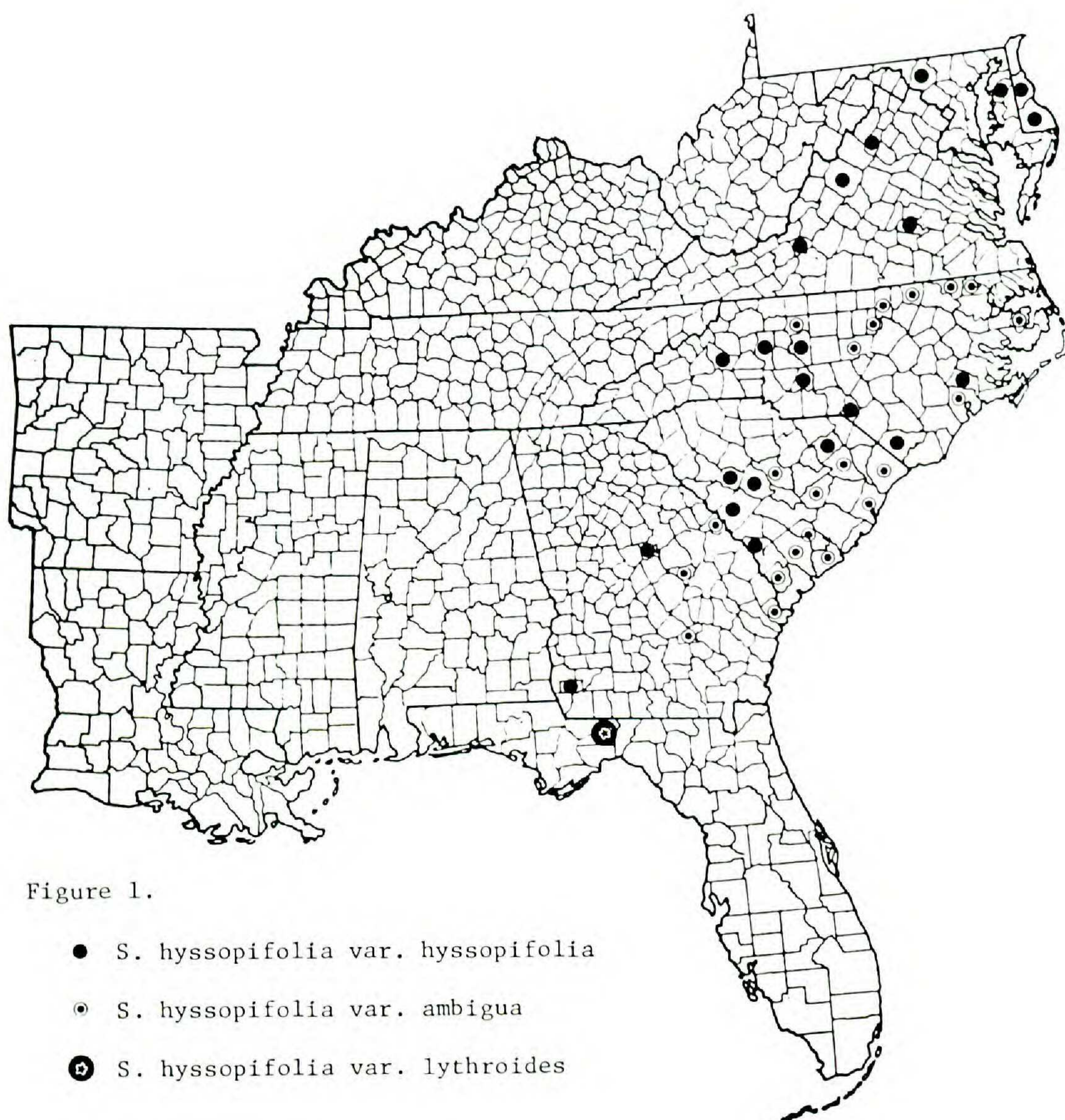


Figure 1. Documented distribution of *Stachys hyssopifolia*.

2. *STACHYS EPLINGII* J. Nelson, *Brittonia* 31:491–494. 1979.

TYPE: U.S.A. VIRGINIA: Bull Run Mountains, 29 Jun 1941, *Allard* 8985 (HOLOTYPE: NY!; ISOTYPES: F! GH! VPI!).

Perennial. Flowering stems 8–15 cm tall, erect, unbranched or branched at the base; lower stem sides generally glabrous to pustulate with crusty, swollen hairs, the upper stem sides glandular-pubescent to hispid; stem angles often reddish, usually hispid with jointed, retrorse trichomes; nodes lightly bearded. Leaves 7–10 cm long, about 3.5 cm wide, dark green, short-petioled or sessile, with a rank odor when crushed; blades ovate to elliptic, apex acuminate, margins finely serrulate to crenate; leaf base rounded to slightly cordate; upper leaf surface canescent to scabrous, lower surface usually glandular-pubescent, the veins bristly. Inflorescence of 8 (or more)-flowered verticils, each with a pair of foliose bracts. Calyx 3.5–4.5 mm long, the deltoid lobes 0.8–2 mm long, often ciliate, and short awned; calyx surface sometimes reddish, mostly glandular or hispid. Corolla white with purple dots. Mericarps 1.7–2 mm long, reticulate to irregularly bumpy.

Mountain forests, bogs, slopes, and meadows, primarily of the Blue Ridge Mountains from West Virginia to western North Carolina. Also reported from the District of Columbia (fig. 2). A large-leaved variety seems restricted to the Ozark Mountains.

Epling (1934) treated this species as *S. nuttallii*, a misapplied name (see Nelson and Fahey 1979). In Epling's treatment, the occurrence of three forms of this species was discussed. Such a designation of three forms seems unwieldy: the characters of the indumentum, by which he based the divisions, are probably effects of age and/or ecology rather than inherited features. This is largely true for considerations of other taxa as well.

3. *STACHYS TENUIFOLIA* Willd., *Sp. Pl.* 3:100. 1800.

TYPE: U.S.A. PENNSYLVANIA (according to Epling, 1934, but not so indicated on herbarium label): *Muhlenburg* (?) *s.n.*, without date (Probable HOLOTYPE: B; Microfiche!; Photograph!).

Perennial from thickened rhizomes and tubers. Aerial stems 60–80 cm tall at flowering, these often much branched from the base or the upper nodes; stem sides glabrous, the angles variously roughened, bristly-hispid, or smooth. Leaves variable in size, reduced upward, 5–10 cm long, 1–3 cm wide, the petioles of variable length, but usually about 1/4 the length of the lowest leaves; leaf blades elliptic, elliptic-ovate, to lanceolate, the apex acuminate to long-tapered, the base cuneate, rounded, or truncate, with margins generally coarsely toothed, glabrous to nearly ciliate, with various surface pubescence. Inflorescence an interrupted raceme (or often branched at the uppermost sterile node, forming three "racemes"), with 9–12 pairs of axillary cymes, these usually 6-flowered; bracts foliose, glabrous to hispid, reduced apically. Calyx campanulate, short-pedicelled, the tube 3–4

mm long, the deltoid, acuminate, or spinulose lobes 2–3 mm long, often divergent in fruit, glabrous to hispid. Corolla 1–1.2 cm long, 5–6 mm long, white to light pink with purple spots, generally glabrous, or with the outer surface lightly canescent. Mericarps 1.5–2 mm long, 1.5 mm wide, depressed-obovoid, dark brown, usually reticulate.

3a. *STACHYS TENUIFOLIA* Willd. var. *TENUIFOLIA*

S. hispida Pursh, Fl. Am. Sept. 2:407. 1814.

TYPE: *Clayton s.n.* (HOLOTYPE: BM).

S. tenuifolia Pall. in Link, Enum. Hort. Berol. 2:109. 1822.

TYPE: CRIMEA, without date, *Pallas s.n.* (HOLOTYPE: HAL; Photograph of holotype!).

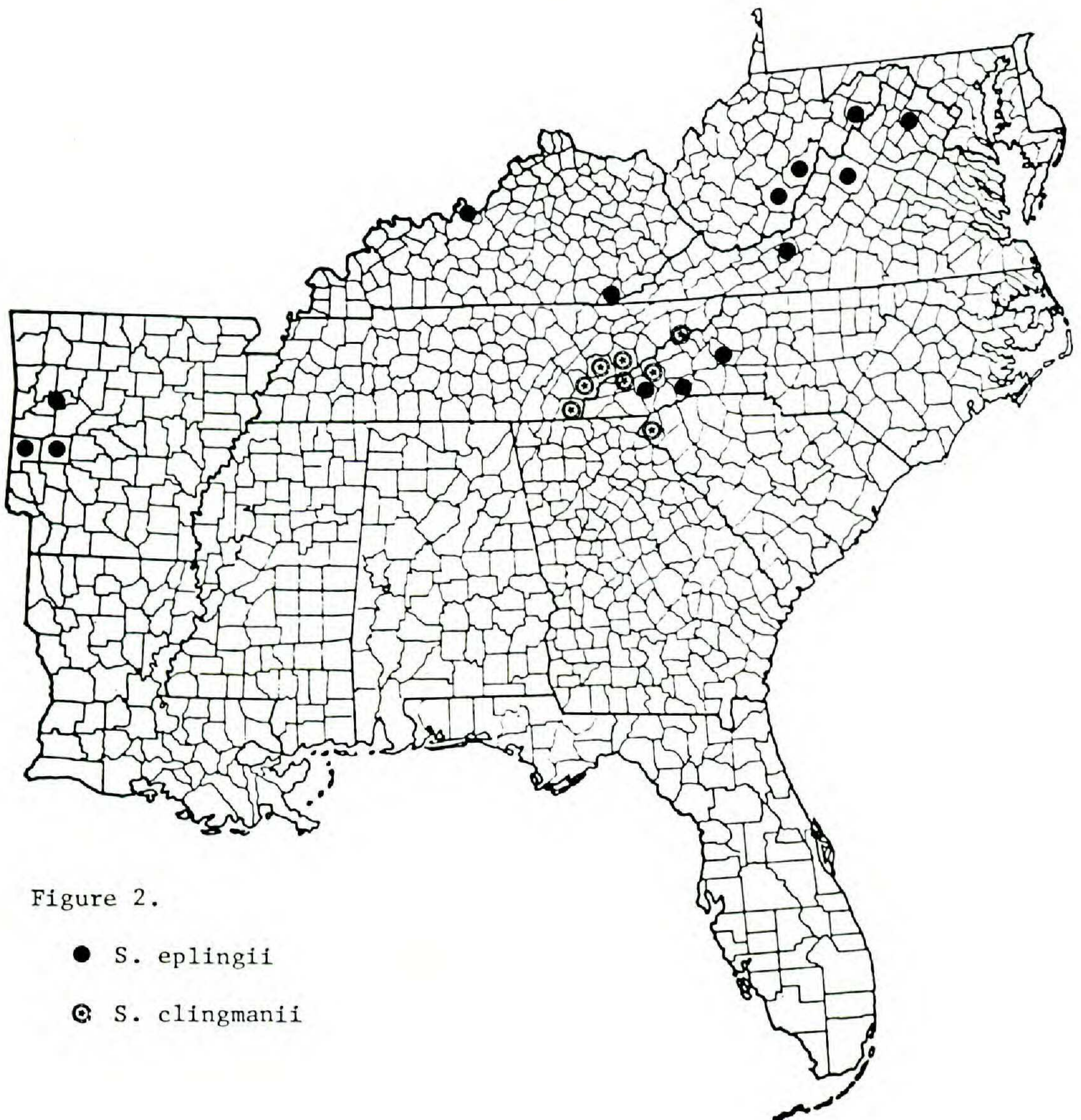


Figure 2.

● *S. eplingii*

⊙ *S. clingmanii*

Figure 2. Documented distribution of *Stachys eplingii* and *Stachys clingmanii*.

S. glabra Riddell, Suppl. Cat. Ohio Pl. 16. 1836.

TYPE: U.S.A. OHIO: Worthington, *Riddell s.n.* (HOLOTYPE: US!).

S. palustris L. var. *glabra* (Riddell) A. Gray, Man. Bot. N. States and Can. 317. 1856. Ed. 2.

S. palustris L. var. *aspera* (Michx.) A. Gray, Man. Bot. N. States and Can. 317. 1856. Ed. 2.

S. aspera Michx. var. *glabra* A. Gray, Syn. Fl. 2:387. 1878.

S. cincinnatensis Ktze., Rev. Gen. 2:531. 1891.

TYPE: U.S.A. OHIO: near Cincinnati, *Kuntze s.n.* (HOLOTYPE: NY!).

S. tenuifolia Willd. var. *aspera* (Michx.) Fern., Rhodora 10:85. 1908.

S. tenuifolia Willd. var. *hispida* (Pursh) Fern., Rhodora 45:469. 1943.

S. tenuifolia Willd. var. *platyphylla* Fern., Rhodora 45:468. 1943.

TYPE: U.S.A. VERMONT: *Williams s.n.* (HOLOTYPE: GH!).

S. palustris L. var. *hispida* (Pursh) Boivin, Phytologia 22:381. 1972.

Flowering stems sparingly to highly branched, the angles glabrous to markedly hirsute. Leaves 7–8 cm long, blades variable, mostly elliptic, the bases rounded or very slightly cordate, the apex acute to acuminate, both surfaces glabrous to hispid, or on the lower surface pubescence on the veins only. Calyx tube about equalling the lobes.

Widely distributed in the southeast except for Florida and most of Georgia and Alabama, extending north to New York and west to Minnesota; Epling reported (1934) its occurrence in Kansas (fig. 3). A variety of habitats, including bottomlands, thickets, shores, and roadsides.

Morphological conceptions of this variety have varied widely. To be sure, within the genus in the southeast, the highest degree of plasticity seems to occur in their variety of *S. tenuifolia*. The typical variety is considered "classically" to be nearly glabrous, with thin, long-petioled leaves, and with calyx lobes as long as the calyx tube. In the southeast, I have seen specimens referable to this variety that contradict one, two, or all three of these character states.

Mostly on the basis of pubescence, Pursh separated *S. hispida* as a species exhibiting *tenuifolia*-like characters but with a high degree of pubescence, especially along the stem-angles, and with short-petioled leaves. Epling's (1934) idea of the variety was little short of amazing, in which *S. hispida* Pursh was "derived from *S. ambigua* Smith, probably after intermixture with *S. byssopifolia*." Thus, his suggestion was that *S. byssopifolia* acted as a parent with a sterile European hybrid, giving rise to another hybrid with *tenuifolia* affinities.

Fernald (1943), however, considered *S. tenuifolia* and *S. hispida* as "the two extremes of a rather polymorphous species," segregating *S. hispida* as a variety of *S. tenuifolia*. Quantitative determinations concerning the status of *S. hispida* relative to *S. tenuifolia* in Ohio indicate that Fernald's treatment is at least reasonable; a continuum of character states between the glabrous and hispid forms does exist, suggesting one large species (Cooperrider and Sabo 1969).

In my study, specimens recognizable as var. *hispida* (Pursh) Fern. were

separated, for convenience, from those of the typical variety. It appears that *S. tenuifolia* is a highly variable taxon, containing forms referable to var. *hispida*. Whereas Fernald considered these pubescence forms as fairly distinct both morphologically and geographically, I have found continuous gradation from one to the other, and, at the same time, completely sympatric distributions for them.

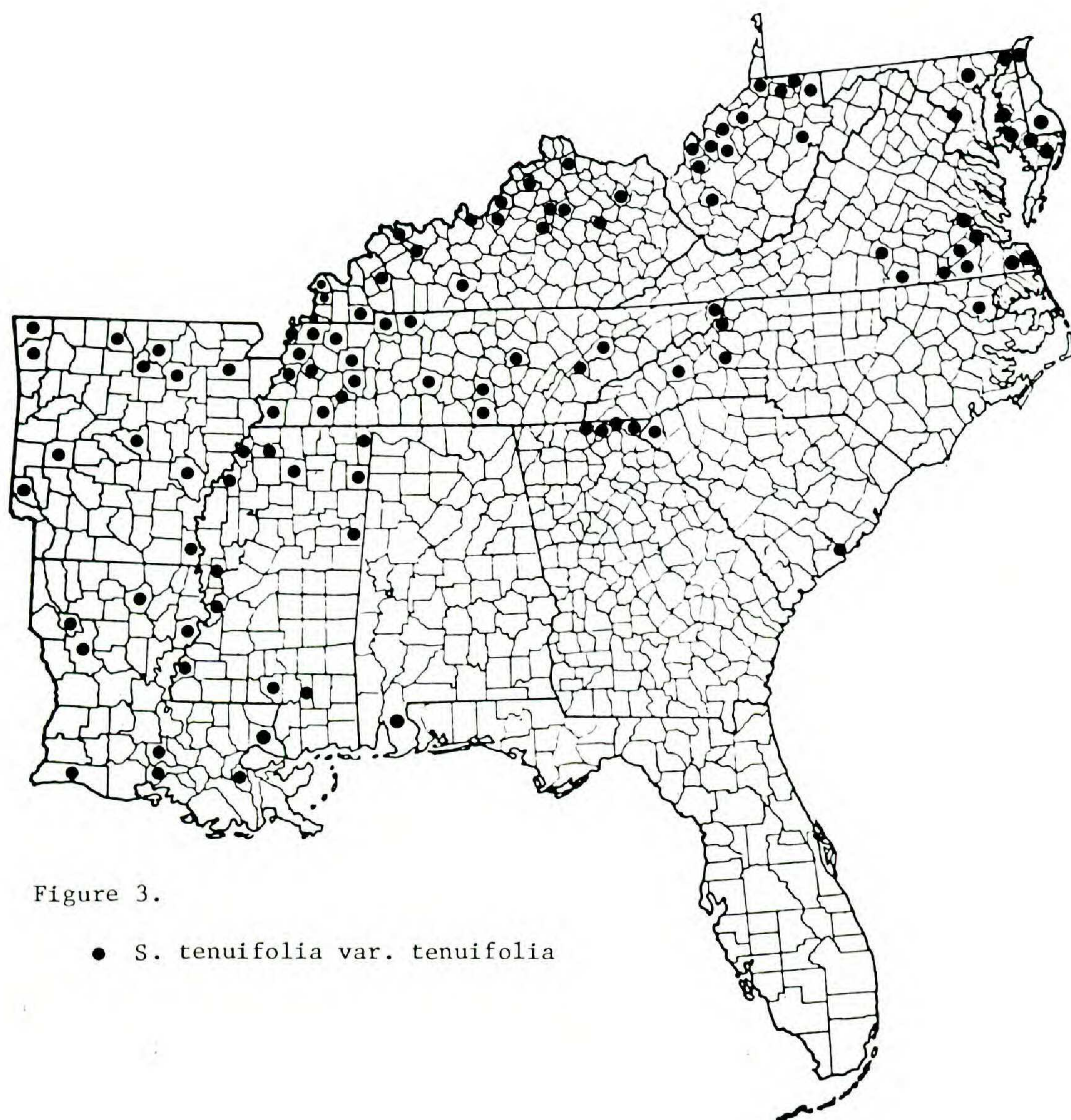


Figure 3.

● *S. tenuifolia* var. *tenuifolia*

Figure 3. Documented distribution of *Stachys tenuifolia* var. *tenuifolia*.

3b. *STACHYS TENUIFOLIA* var. *PERLONGA* Fern. Rhodora 45:466, pl. 788. 1943.

TYPE: U.S.A. VIRGINIA, Greensville Co.: *Fernald & Long 13435* (HOLOTYPE: GH!; ISOTYPES: MO, NY!, PH!, TENN!).

Flowering stems sparingly branched, the angles glabrous or sometimes with spreading trichomes. Leaves 9–12 cm long, with distinct, short petioles, nearly sessile, lanceolate with long-acuminate apices, the bases more or less truncate, both surfaces slightly hispid. Calyx tube and lobes about equal in length.

Lower Mississippi River valley from Kentucky to Louisiana and Mississippi, also on the Atlantic coast from Delaware to South Carolina (fig. 4). Low swampy woods.

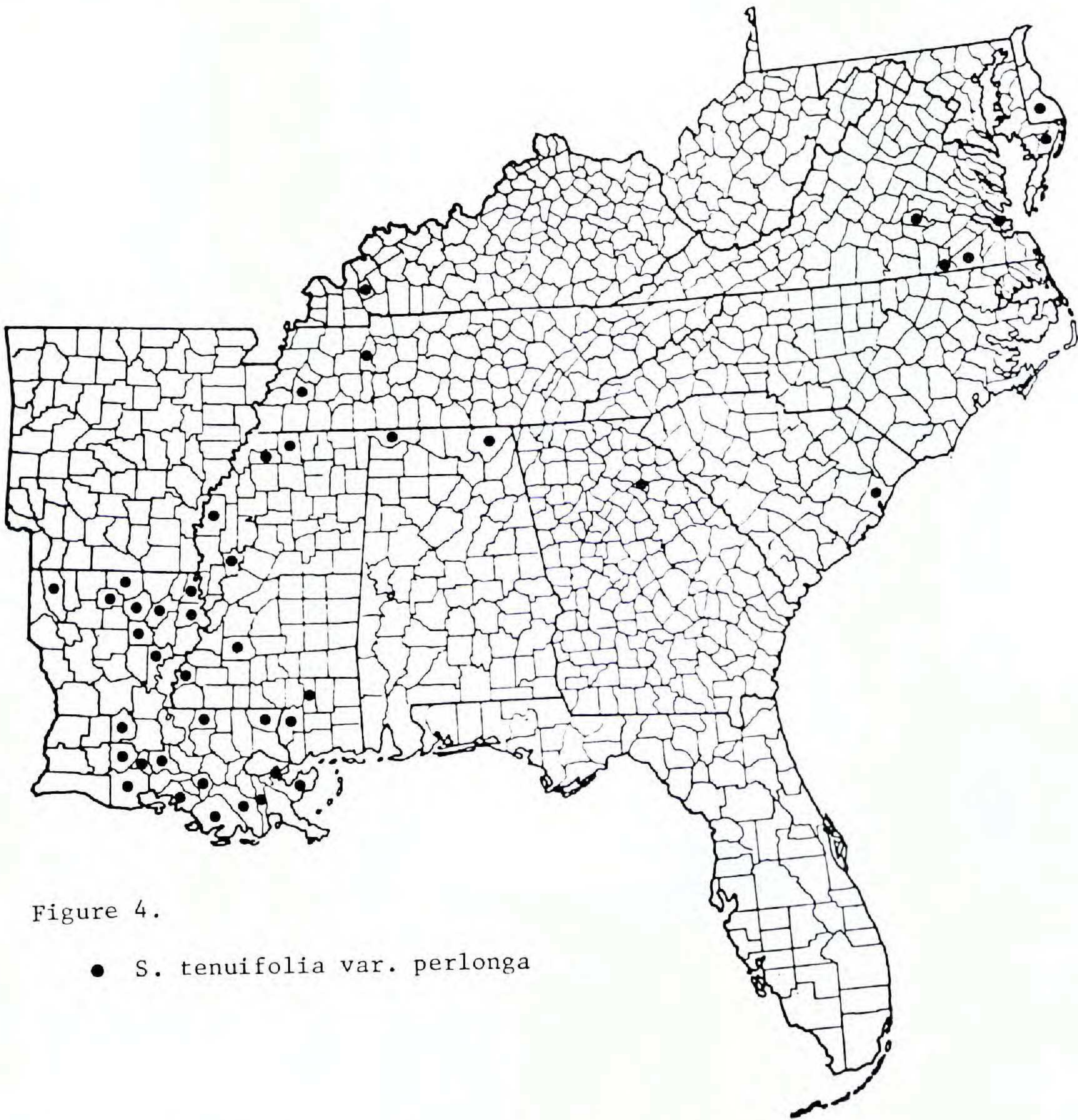


Figure 4.

● *S. tenuifolia* var. *perlonga*

Figure 4. Documented distribution of *Stachys tenuifolia* var. *perlonga*.

This variety is segregated largely on the basis of leaf shape, which is substantially different from that seen in *Stachys* elsewhere in our area. Plants from Virginia are the most pubescent; those from Louisiana and the Mississippi River valley are generally glabrous. The distribution map suggests that the variety is centered in two areas, with Georgia and Alabama forming a connecting bridge; these collections from Georgia and Alabama seem dubious, however, and may, in fact, have closer affinity to the typical variety.

3c. *STACHYS TENUIFOLIA* Willd. var. *LATIDENS* (Small in Britton) J. Nelson, *Phytologia* 46:94. 1980.

Basionym: *S. latidens* Small in Britton, *Man. Fl. N. U. S.* 793. 1901.

TYPE: U.S.A. VIRGINIA: White Top Mountain, *Small s.n.* (HOLOTYPE: NY!; ISOTYPES: F! MO(2)!, PENN!, PH(2)!).

Flowering stems often branching from fragrant rootstocks (when fresh), the stem angles roughened with short pusticulate trichomes. Leaves 10–18 cm long, the petioles short or well-developed, the blades elliptic to ovate, glabrous to almost scabrous (on the upper surface), the base rounded to nearly cordate. Calyx tube longer than the deltoid lobes.

Blue Ridge Mountains and upper Piedmont, from east-central West Virginia and central Virginia to upper Georgia and northwestern South Carolina (fig. 5). Mountain slopes, bottomlands, and summits.

I have seen a few sheets of this variety from western Pennsylvania, projecting its range farther northward. Along the Blue Ridge Parkway, extensive roadside populations have been noted in various counties of North Carolina. This variety in such areas is usually in moist drainage areas and in full sun; other populations along the Parkway appear almost weedy, spreading in planted shrubbery. Such colonies growing in the sun are, not surprisingly, sparingly branched and strong-stemmed. Shaded colonies are also frequent; I have seen several of these populations, including ones in southwestern Virginia, in which the stems are spindlier and have a tendency to branch. In study of herbarium material, I noted that *S. latidens sensu* Small varied somewhat in calyx-lobe length. The lobes of the specimens serving as isotypes fit the species description very well, the lobes being described by Small as "triangular, very short." These plants from which Small described his species are with calyces rather swollen (due to the presence of ripening mericarps within), causing the lobes to appear very short. Plants from the rest of the range may have calyx lobes similarly short, or longer, although the lobes are not so long as those of the typical variety or var. *perlonga*. Except for calyx-lobe features and geographic distribution, this plant closely resembles a form of the typical variety of *S. tenuifolia*. It seems most convenient to treat this entity as a variety of *S. tenuifolia* restricted to the Blue Ridge. Fernald's (1943) scheme would suggest var. *latidens* as the ancestral stock for the other two varieties of the species. Several specimens collected by Small from Washington County (at the same locality as the

holotypes) are labeled "*S. aspera* Michx." The herbarium labels on these sheets are identical with those on the type specimens (same collection data, altitude, printing) and the plants themselves are inseparable from the holotype and isotypes. For some reason, Small considered these collections different from his new species. Otherwise, they would be considered isotypes themselves had Small labeled them "*S. latidens*."

4. *STACHYS NUTTALLII* Shuttleworth ex Benth. in DC. Prodr. 12:469. 1848.

TYPE: U.S.A. TENNESSEE: Cumberland Mountains, *Rugel s.n.* Jun 1842 (ISOTYPES: KEW!, NY!).

S. cordata Riddell, Suppl. Cat. Ohio Pl. 15. 1836.

TYPE: U.S.A. OHIO: *Riddell s.n.* (HOLOTYPE: US!).

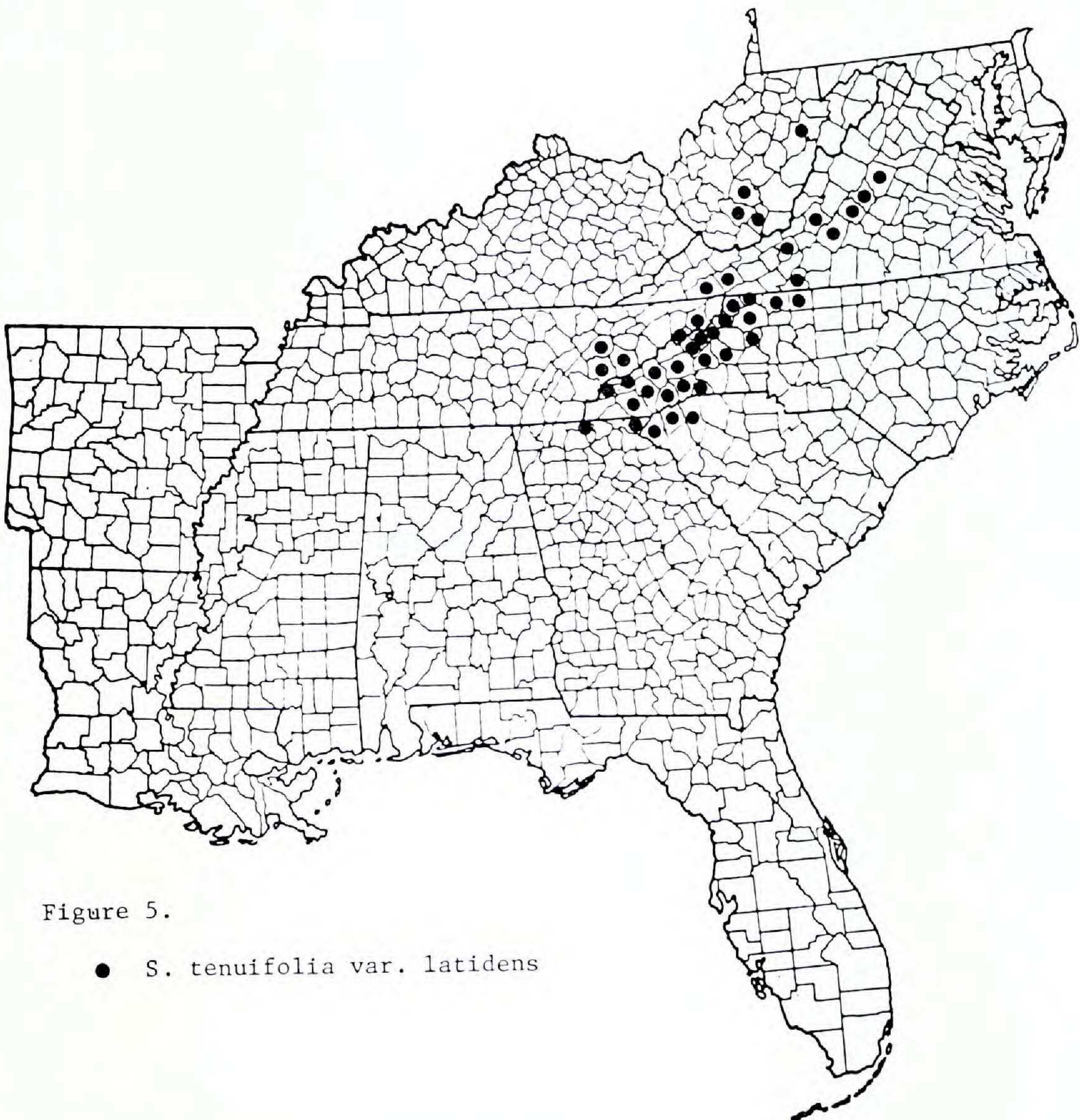


Figure 5.

● *S. tenuifolia* var. *latidens*

Figure 5. Documented distribution of *Stachys tenuifolia* var. *latidens*.

S. palustris L. var. *cordata* (Riddell) A. Gray, Man. Bot. N. States and Can. ed. 2. 317. 1856.

S. salvioides Small, Fl. S. E. U. S. 1032. 1902.

TYPE: U.S.A. TENNESSEE: White Cliff Springs, *Kearney s.n.* (HOLOTYPE: NY!).

S. riddellii House, Bull. N. Y. State Museum 233:60. 1921. Based on *S. cordata* Riddell.

S. subcordata Rydb., Torrey 27:88. 1927.

TYPE: U.S.A. VIRGINIA: Bedford Co.: *Rydberg s.n.* (HOLOTYPE: NY!).

Perennial, sparingly branched, from elongated, thickened rhizomes the stems 60–70 cm tall at flowering; stem angles hispid with scattered to numerous stiff, curly hairs (especially near the base), the stem sides minutely glandular-pubescent apically. Leaves 9–12 cm long, distinctly petioled, the apex attenuate, the margins serrated with broad, ascending teeth and often ciliate, the leaf base markedly cordate or sometimes merely rounded, the leaf blades widely ovate; leaf surfaces uniformly and equally pubescent with scattered straight hairs. Inflorescence an interrupted raceme to 12 cm long, with 5–11 axillary verticils, each 6-flowered, and with a pair of much-reduced hispid bracts, these further reduced up the inflorescence. Calyx slightly hispid, the tube longer than the acute lobes, each lobe short-awned. Corolla 13 mm long, white to light pink, finely glandular on the outer surface. Mericarps 2 mm long, broadly obovoid and rounded, dark brown.

West Virginia to Kentucky and Ohio, south to central Tennessee and western North Carolina (fig. 6). A forest species, no doubt shade tolerant, most common on bottomlands of the Blue Ridge Mountains.

Stachys salvioides Small and *S. subcordata* Rydb. are easily assigned to this species, representing variants in its range. Epling (1934) referred to *S. subcordata* as "an anomalous form"; to my knowledge it is known from only two collections in Virginia (one being the holotype). Dr. J. F. Matthews at the University of North Carolina-Charlotte has brought to my attention his collections of a *Stachys* referable to this species from Montgomery County on the Piedmont of North Carolina: this appears to be a rather interesting range extension for *S. nuttallii*. A visit to the site in the Uwharrie Mountains does indeed show typical shade-growing plants, the population extending from about 100 meters down the east shore of the Yadkin River.

5. STACHYS CLINGMANNII Small, Fl. S. E. U. S. 1032, 1037, 1903.

TYPE: U.S.A. NORTH CAROLINA: Clingman's Dome, *Beardslee & Kofoed s.n.* (HOLOTYPE: NY!).

Perennial, branched, 50–100 cm tall, from tuberous elongated rhizomes at or just below soil level. Stem angles copiously hispid with simple or jointed (2–3 celled) trichomes, these more numerous distally, the sides generally glabrous. Leaves 8–12 cm long, the distinct, hispid petioles apically shortened, blades ovate to narrowly elliptic, apices acute to long acuminate, margins coarsely toothed or crenate-denticulate, with teeth nearly at right

angles to the ciliate margin, base cordate to truncate or rounded, sometimes oblique, both leaf surfaces heavily pubescent with simple or multicellular hairs to 1 mm long, younger leaves generally with a dense indumentum. Inflorescence 8–21 cm long, with 9–14 axillary verticils, each 6-flowered and subtended by a pair of foliose, pubescent bracts, these elliptic to rhomboid. Calyx tube 4–5 mm long, about twice as long as the acute lobes, each lobe hispid along the margins and awned. Corolla 11–16 mm long, white with fine purple spots and lines, glabrous, or finely canescent on the outer surface of the upper lip. Mericarps 2 mm long, broadly obovoid, dark brown.

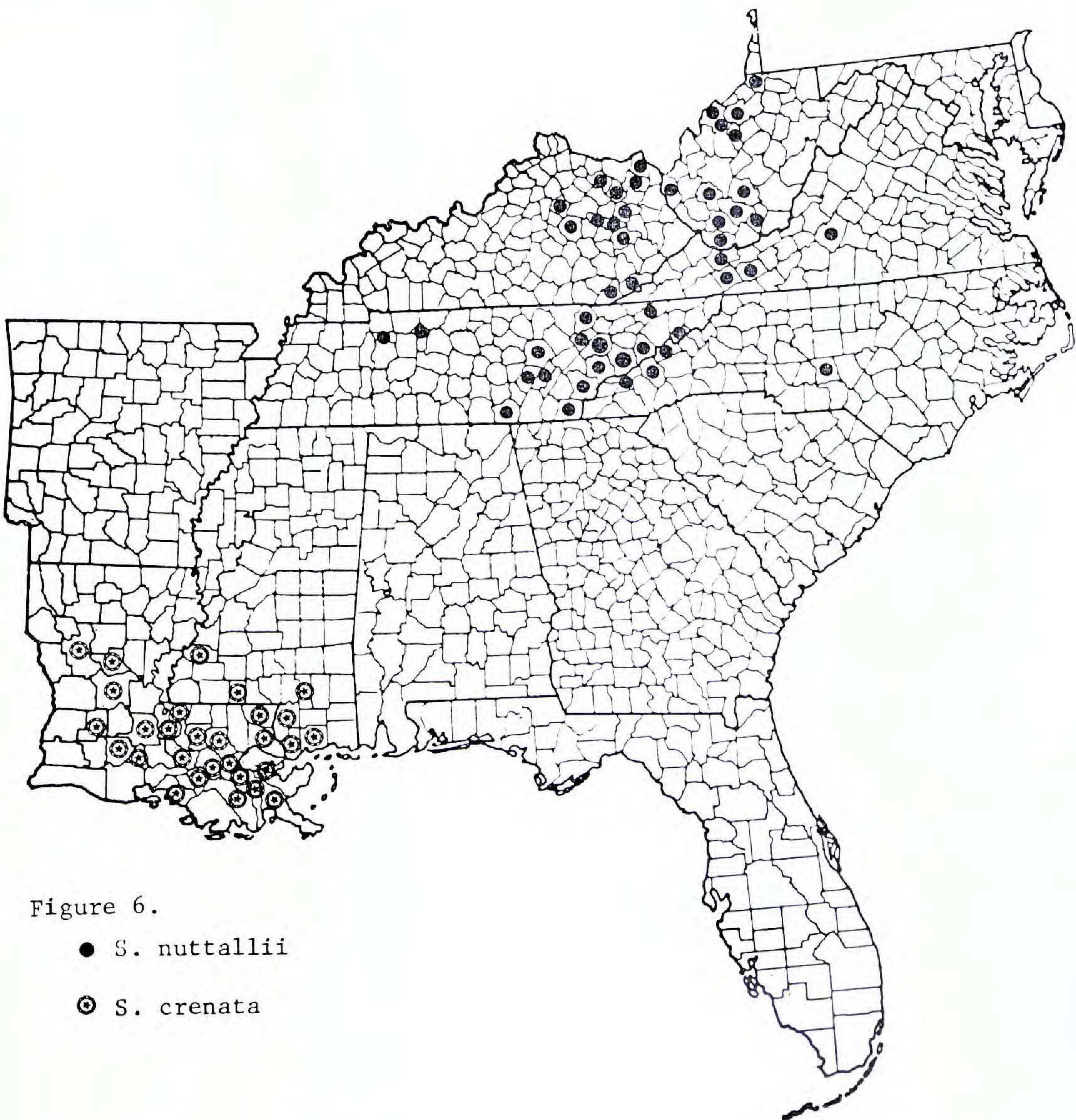


Figure 6.

● *S. nuttallii*

⊙ *S. crenata*

Figure 6. Documented distribution of *Stachys nuttallii* and *Stachys crenata*.

Sporadic in the Blue Ridge Mountains along the North Carolina-Tennessee boarder, south to Oconee County, South Carolina (fig. 2). A shade tolerant forest species found in cool, moist coves.

Epling (1934) referred to this species as "a dubious form," probably in light of its similarities to *S. nuttallii*. Further, he indicated its range as extending west to Indiana, possibly confusing it with something else (such as hispid forms of *S. tenuifolia*). Within the southeast, however, this taxon is fairly distinctive morphologically.

6. *STACHYS FLORIDANA* Shuttleworth ex Benth. in DC. Prodr. 12:478. 1846.

TYPE: U.S.A. FLORIDA: near Jacksonville, *Rugel* 176 (ISOTYPES: BM, F, MO, US, NY!).

Perennial, erect, from rhizomes ending in whitened tubers, the nodes and internodes distinct. Flowering stems 8–64 cm tall, unbranched or highly branched from lower nodes; stem angles glabrous or with scattered trichomes, the sides glabrous or lightly pubescent near the apex. Basal and lower leaves 5–9 cm long, the petioles 1–5 cm long, upper leaves short-petioled to nearly sessile, 1–5 cm long; blades oblong to rhombic, the surfaces glabrous to sparingly pubescent with simple and jointed trichomes; apex acute to nearly obtuse, the margins crenate to crenulate, ciliate, the base truncate to shallowly cordate. Inflorescence 7–17 cm long, with 3–12 axillary verticils, each 6 (or fewer)-flowered; axillary bracts trullate, variously serrated. Calyx tube bristly-hispid, 6–7 mm long, about twice as long as the acute lobes, often reddish above. Corolla 13 mm long, the lower lip flaring, white to pink with purple spots. Mericarps 1.5 mm long, equally as broad, dark brown.

Almost throughout the southeastern United States, from Virginia southward through Florida, and to Louisiana (fig. 7). A weedy species found in many disturbed sites, *S. floridana* grows well in a variety of soil types, wet and dry. It can be found almost throughout the year, at least in the southern part of its range, in vegetative condition. Collections are known from the Florida Keys as well as from the Smoky Mountains.

From the standpoint of economic interest, this species is the most important one of the genus in the southeast, due to its great success as a weed. It is easily capable of establishing itself once the tubers are buried. Gibbs (1968) has noted, as have I (Nelson 1975), that *S. floridana* grows very well in nursery stock and ornamental greenhouses. The single most important reason for its expanding distribution must be its being moved in nursery stock, especially azaleas and camellias. Since Florida is one of the most active states in the ornamental nursery trade, it is possible that nearly all of the collections of *S. floridana* in the southeast could be traced, directly or indirectly, to Florida. Indeed, in practically every nursery in Florida I visited to search for this species, I have found it. This species' present distribution is based mostly on very recent collections. Shinnars (1963) con-

sidered it to have been endemic to Florida until the 1940s or 1950s, when many populations began appearing outside the state. Once established, a population of *S. floridana* grows rapidly in confined or open areas, tending to choke out other plants if in a lawn or garden. Most attempts at eradication of the species fail: any disturbing of the tubers seems to encourage new growth. The tubers themselves are edible raw, though rather insipid, and, according to some herbarium label data, can be turned into pickles. A similar Asiatic species, *S. affinis* Bunge, is commonly cultivated in Japan for "Chinese artichokes"; Shinnars (1963) suggests that this species is present in the southeastern United States as well, which, if true, suggests a strong similarity between the two species.

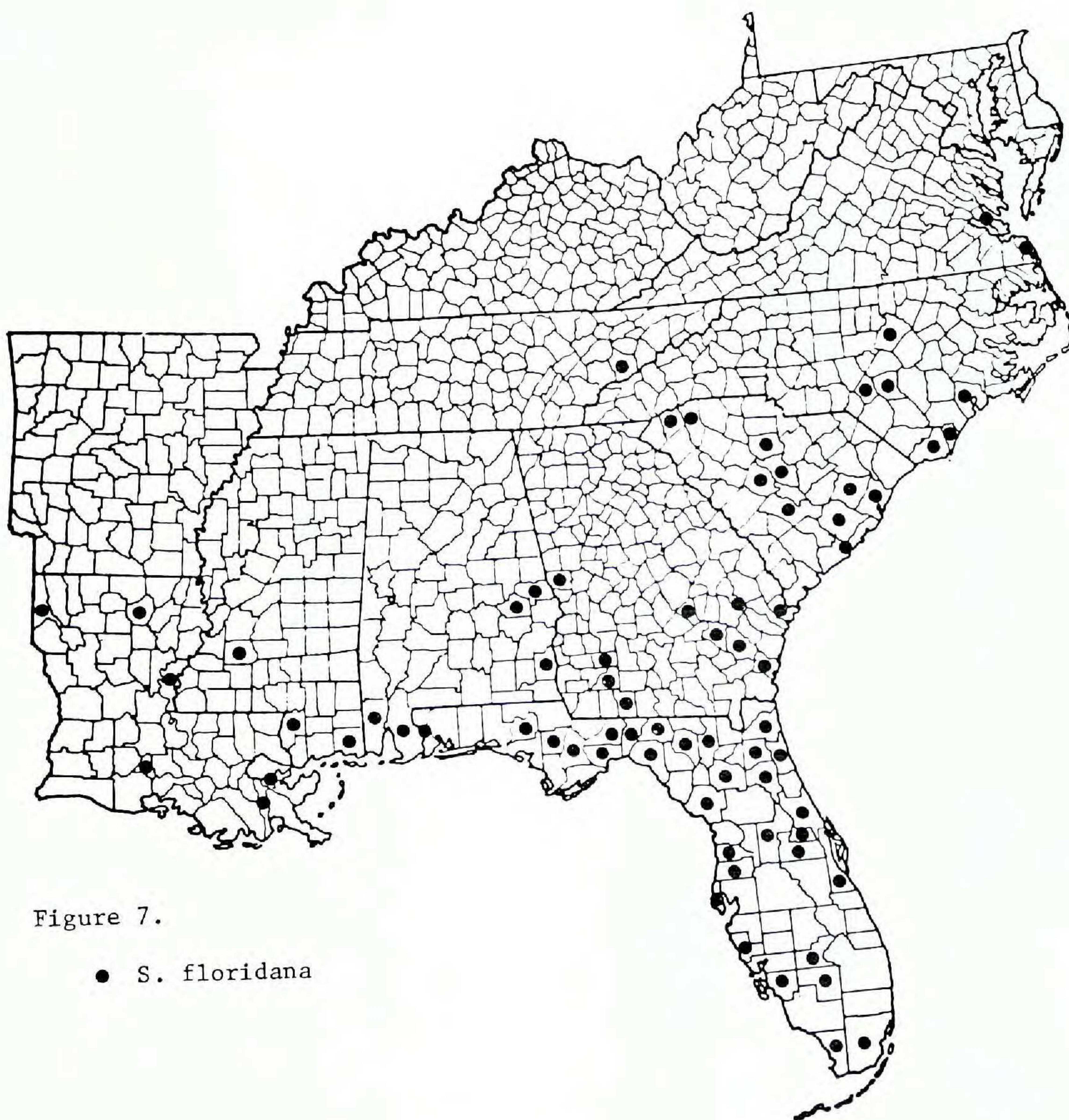


Figure 7. Documented distribution of *Stachys floridana*.

7. STACHYS CRENATA Raf., Florula Ludoviciana 42. 1817.

TYPE: U.S.A. presumably LOUISIANA (HOLOTYPE: unknown, possibly at P).

S. agraria Cham. & Schlecht., Linnaea 5:100. 1830.

TYPE: MEXICO, near Jalapa, *Schiede* 143 (ISOTYPE: HAL, photograph!).

S. crenata Philippi, An. Univ. Chile 90:562. 1895.

TYPE: CHILE, near Carrizal (HOLOTYPE: not known).

Annual, sprawling or sometimes erect, from fibrous roots. Flowering stems 20–40 cm tall, highly branched from lower nodes, the angles and sides hirsute. Lower leaves 2–4 cm long, 1–3 cm wide, the upper leaves 2–3 cm long, 0.5–1.5 cm wide, ovate, obovate, or oblong, the margins crenate, crenulate, or nearly entire, sometimes ciliate, the base truncate to shallowly cordate, the apex acute, both leaf surfaces sparingly to copiously hirsute with long, soft trichomes, especially veins of lower surface. Inflorescence an interrupted raceme 4–20 cm long, with about 13 axillary verticils, each 6 (or fewer-flowered, each verticil subtended by a pair of foliose, subsessile bracts. Calyx short-pedicelled, with 2 minute hispid bracteoles, the tube 4–4.5 mm long, densely hispid, equal in length to the acuminate, hispid lobes, each lobe with a pointed, glabrous awn. Corolla scarcely exerted from the calyx, light purple with darker spots. Mericarps 1 mm long, flattened or depressed-obovoid.

Restricted in the southeast to southern Mississippi and Louisiana; ranging outside our area along the coast of Texas.

Both *S. crenata* and *S. floridana* occur in similar weedy habitats, especially disturbed areas around building sites. I have seen it along grassy highway medians and occasionally as a volunteer on gravelly rooftops. The two species are easily separable: *S. crenata* does not produce rhizomes or tubers and has much smaller flowers.

DOUBTFULLY ESTABLISHED SPECIES

STACHYS PALUSTRIS L. This circumboreal species is sporadically collected in the most northern of the southeastern states. It is a more important element of the North American flora outside of our range, being distributed from Labrador to Alaska and southwest to New Mexico.

STACHYS ANNUA L. Known in the southeastern United States only from Norfolk County, Virginia, this species might be expected rarely as a ballast weed.

STACHYS GERMANICA L. Rare and localized (perhaps as a garden escape), a rather striking plant due to its heavy pubescence. Known in southeastern United States from single sites in western Florida, central Tennessee, West Virginia, and Virginia.

STACHYS OLYMPICA Poir. Frequently cultivated for its silvery-lanate foliage, and occasionally naturalizing. This species occurs as a weed in New England and further northward.

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REFERENCES

- BENTHAM, G. 1832-1836. Labiatarum genera et species. London.
- BRIQUET, J. 1897. Labiatae in A. Engler and K. Prantl, Die natürlichen Pflanzenfamilien IV:183-375. Leipzig.
- BRITTON, N. L. and H. A. BROWN. 1947. An illustrated flora of the northern United States, Canada and the British possessions. Second edition, revised and enlarged, New York Botanical Garden. Lancaster.
- COOPERRIDER, T. S. and R. F. SABO. 1969. *Stachys hispida* and *S. tenuifolia* in Ohio. Castanea 34:432-435.
- ELLIOTT, S. 1824. A sketch of the botany of South Carolina and Georgia. 2:74-76. Charleston.
- EPLING, C. C. 1934. Preliminary revision of American *Stachys*. Repert. Spec. Nov. Regni Veg. 80:1-73.
- FERNALD, M. L. 1943. A Virginian botanizing under restrictions. Rhodora 45:465-475.
- . 1950. Gray's manual of botany, edition 8. New York. [p. 1230-1234]
- GIBBS, L. C. 1968. Weeds of the southern United States. Unnumbered bulletin, United States Department of Agriculture.
- GRAY, A. 1886. Synopical flora of North America: The Gamopetalae. New York. [p. 386-387]
- LINNAEUS, C. 1753. Species plantarum. Stockholm. [p. 74]
- NELSON, J. B. 1975. Distributional notes on *Stachys floridana* (Lamiaceae). Abstract. Association of Southeastern Biologists Bulletin 22(2):70.
- and J. E. FAIREY III. 1979. Misapplication of the name *Stachys nuttallii* (Lamiaceae) to a new southeastern species. Brittonia 31:491-494.
- RADFORD, A. E., H. E. AHLES and C. R. BELL. 1968. Manual of the vascular flora of the Carolinas. Chapel Hill. [p. 909-911]
- SHINNERS, L. H. 1963. Southeastern records of *Stachys affinis* (*S. sieboldii*) and *S. floridana* (Labiatae). Castanea 28:44-46.
- SMALL, J. K. 1933. Manual of the southeastern flora. New York. [p. 1159-1161]
- TOURNEFORT, J. P. de. 1700. Institutions rei herbariae. Editio altera, gallica longe auctior, quingentis circiter tabulis aneis adornata. Paris. [p. 186]
- WILCOX, C. C. and B. M. G. JONES. 1974. The identification and origin of *Stachys* \times *ambigua* Sm. Watsonia 10: 139-147.